



What do you do with 30 years of old Fortran code?

You start over...



The World's First Component-Based
Software Development Environment
for Computer Visualization



Invented here. Tested here. Licensed to industry.

LOS ALAMOS NATIONAL LABORATORY Technology Opportunity

Applications:

- Aerospace engineering
- Animation and special effects
- Computational fluid dynamics
- Fluid/solid interaction modeling
- Automotive design
- Weapon/target interactions
- Pharmaceutical process design
- Homeland security planning

Benefits:

- Provides accurate, physics based computer simulations in Java
- Provides faster and lower-cost development
- Allows for easy modification and integration of code
- Runs on most hardware platforms without modification, from single PCs and Macs to parallel-processing supercomputers
- Increases software developer productivity
- Allows state-of-the-art simulations for complex reactive flows

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The World's Greatest Science
Protecting America



Summary:

CartaBlanca is a state-of-the-art, object-oriented, computer simulation development environment that offers next-generation modeling and simulation capabilities to scientists in multiple disciplines. CartaBlanca's most advanced feature is its capability to model fluid/particle interactions using the particle-in-cell method and the material-point method in combination. This advanced modeling technique allows scientists to simulate effects from fluid blast waves to impellers.

Written in the developer-friendly Java™ language, Carta Blanca enables computer code developers to simulate complex nonlinear effects such as airflow through a turbo booster, blast effects on buildings, or heat transfer along a semiconductor. Unlike legacy simulation environments, the CartaBlanca environment has built-in thread parallelization that allows for easy integration into shared-memory and distributed-memory machines.

CartaBlanca is superior to legacy code and other developments that rely only roughly on component architectures (e.g., C/C++/Python), because it is written from the ground up in Java. The Laboratory's legacy-free Java code means that CartaBlanca is easy to modify and operate. The graphical user interface is intuitive, permitting engineers to jump right in to produce accurate fluid dynamics simulations.

CartaBlanca takes advantage of the improved execution speed offered by the HotSpot™ compiler, opening up the field of physical modeling to a much broader set of programmers. Its modular design allows for rapid software application or simulation code prototyping; strong, extensive compiler checking; plug-and-play module insertion for modeling physical systems; solutions with consistent results; and integrated unit and regression testing. Fluid/solid interactions, phase changes, stresses and displacements, and chemical reactions can all be studied in a precise manner using CartaBlanca. The types of fluid dynamic effects that can be modeled with CartaBlanca are as complex as the field of fluid dynamics itself. CartaBlanca incorporates true multiphase flow, which allows slippage between phases and multiple momentum equations for each phase. The Jacobian-free, Newton-Krylov solver proves robust, fully coupled solutions to nonlinear fluid equations.

Development Stage:

CartaBlanca is a fully developed software development and programming environment in the easy-to-modify, object-oriented Java™ computer language.

Intellectual Property Status: Copyright protected.

Licensing Status: Available for non-exclusive licensing. Academic pricing for the CartaBlanca 2.0 development environment has been set at \$1,000 per site, with license fees for commercial users starting at \$10,000.

www.lanl.gov/opportunities/techtransfer

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